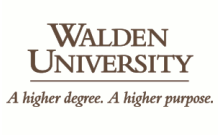

2019

Racial Disparities, Fragmentation of Care, and Adverse Outcomes Associated with Ectopic Pregnancy

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2019

Abstract

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by

Angela Rosa Jourdain

MS, Molloy College, 2007

BS, Spelman College, 1989

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

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Abstract

Ectopic pregnancy (EP) is a rare condition that occurs in 1% of all pregnancies. However, women of lower socioeconomic status (SES) and ethnic minority groups are at greater risk of adverse outcomes associated with EP than White women. The purpose of this study was to examine data from the 2014 National Inpatient Sample to identify predictors of complications from EP in 2,626 females ages 15-44 in the United States. The theoretical framework used to guide this study was the theory of fundamental causes to explain why the association between SES and mortality has persisted despite progressive advances in the diseases and risk factors that are believed to explain it. Independent t-tests were conducted to determine whether significant differences in patient outcomes existed between EP participants who required one medical intervention during hospitalization and those with two or more medical interventions. Multiple linear regression analyses were used to examine the association between race, primary expected payer, income, number of procedure codes on record, number of diagnoses on record, and length of stay. The key findings were that for every increase in number of procedures ($\beta = 0.13$, $p < .001$) the length of stay also increased by 0.13 units; for every increase in number of diagnoses ($\beta = 0.37$, $p < .001$) length of stay increased by .37 units, and within the Black racial/ethnicity ($\beta = 0.05$, $p < .05$) length of stay increased by 0.05 units. Finally, for females within a higher income quartile of $45,000 or more ($\beta = .08$, $p < .001$), length of stay decreased by -0.08 units. Positive social change implications may include assistance to public health professionals in identifying individual factors that place women at increased risk for EP and the ability to increase EP prevention activity in populations that may be more susceptible to the condition and complications.

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Dedication

This study is dedicated to my late parents Virge and Elizabeth Banks. Thank you to both of you for instilling so much confidence in me to pursue my dreams. I wish you were here to see me obtain my doctorate, but I will tell you all about it when I see you again.

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Section 1: Foundation of the Study and Literature Review

Introduction

Maternal mortality poses a public health challenge in the United States of America, evidenced by a doubling of the mortality ratio between 1990 and 2013 from an estimated 12 to 28 deaths per 100,000 births, which is higher than majority of high-income countries and the Islamic Republic of Iran, Turkey, and Libya (World Health Organization [WHO] et al., 2014). Annually, approximately 1,200 women in the United States die from pregnancy-related complications (WHO et al., 2014), with another 60,000 women who experience near-fatal complications (Creanga et al., 2015). In 1986, the Centers for Disease Control (CDC) Division of Reproductive Health began national surveillance of pregnancy-related mortality to capture data about the causes of maternal deaths. According to Healthy People 2020, improvement in the health of mothers is an important public health goal as their welfare impacts the health of future generations and helps determine future public health challenges for communities, families, and the healthcare system (U. S. Department of Health and Human Services [USDHHS], 2018).

Ectopic pregnancy, defined as a fertilized ovum outside of the uterine endometrium, occurs in only 1% of all pregnancies; however, hemorrhage from complications of ectopic pregnancy is the leading cause of pregnancy-related deaths in the first trimester (Stulberg et al., 2014). Pregnancy-related mortality is defined as the death of a pregnant woman within one year of pregnancy caused by complications, a series of events initiated by pregnancy, or the exacerbation of an unrelated condition due to the physiologic effects of pregnancy (CDC, 2013). Ectopic pregnancies account for

approximately 6–9% of all pregnancy-related deaths (Creanga et al., 2015); therefore, early diagnosis and expedient treatment are crucial to reducing morbidity and mortality associated with complications from the condition.

Researchers have linked social determinants to various disparities in health and health outcomes, including race, ethnicity, and SES. These determinants, along with fragmentation in care, have been associated with ectopic pregnancy morbidity and mortality (Stulberg et al., 2016). Advances in the early diagnosis and treatment of ectopic pregnancy since the 1970s have led to declines in morbidity and mortality; however, women of all races, ethnicities, and income levels have not equally benefited (Creanga et al., 2011). To date, most research related to ectopic pregnancy outcomes-focused primarily on authenticating the disproportionately high risk of morbidity and mortality associated with ectopic pregnancy experienced by low-income women as well as racial and ethnic minority groups. Successful reduction of pregnancy-related mortality and disparities requires improvements in ectopic pregnancy outcomes by studying processes of care and determinants of health to advance the health status of all women (Papillon-Smith et al., 2014).

Stulberg et al. (2016) recommended that future research be conducted to perform a more systematic analysis of ectopic pregnancy and outcomes to identify the individual and public health impact of this problem. This study may contribute to positive social change by increasing public health professionals' knowledge that may inform the development of policy and clinical solutions aimed at ultimately facilitating a reduction

in disparities in morbidity and mortality among women diagnosed with ectopic pregnancy.

Results from this study could inform healthcare professionals about educating women of child-bearing age regarding signs and symptoms of ectopic pregnancy and the importance of follow-up care to prevent complications. Study results could be used to promote positive social change by supporting health professionals to identify the characteristics of at-risk women during antenatal visits. The results from the study could also be used in the development of protocols for tracking patients with ectopic pregnancy across multiple care providers from the initial presentation of symptoms to definitive diagnosis and treatment. The implementation of tracking tools will potentially contribute to decreased maternal health complications and improvement in ectopic pregnancy morbidity and mortality rates.

This section provides an overview of this study, the gap in the literature that this work was proposed to address, and the purpose and intent of the study. Subsequent sections provide the background of the issue, followed by the problem statement and purpose of the study. Additional sections include research questions and hypotheses. Finally, the theoretical framework for the study and nature of the study (including the rationale for the selected methodology and study design) are provided.

Background

An ectopic pregnancy occurs in 1% of all pregnancies. However, hemorrhage from complications of ectopic pregnancy is the leading cause of pregnancy-related deaths in the first trimester (Stulberg et al., 2014). Ectopic pregnancies account for

approximately 6-9% of all pregnancy-related deaths (Creanga et al., 2015); therefore, early diagnosis and expedient treatment are essential to ensure positive health outcomes for women diagnosed with this condition.

In 1986, the CDC Division of Reproductive Health began national surveillance of pregnancy-related mortality to capture data about the causes of maternal deaths. Pregnancy-related mortality is defined as the death of a pregnant woman within one year of pregnancy caused by complications, a series of events initiated by pregnancy, or the exacerbation of an unrelated condition due to the physiologic effects of pregnancy (CDC, 2013). According to Healthy People 2020, improvement in the health of mothers is an important public health goal as their welfare impacts the health of future generations and determines future public health challenges for families, communities, and the healthcare system (USDHHS, 2018).

Problem Statement

Despite improvements in the diagnosis, management, and treatment of ectopic pregnancy, disparities in morbidity and mortality persist. Among women receiving Medicaid who are at greater risk for pregnancy-related complications due to their socioeconomic status, women from racial/ethnic minority groups are at greater risk of ectopic pregnancy adverse outcomes than White women (Stulberg et al., 2016). Socioeconomic factors, including education, income, and poverty, account for these disparities (MacDorman, Declercq, & Thoma, 2017). Ectopic pregnancy complications studied among Medicaid beneficiaries in 14 states between 2004 and 2008 showed the risk of any complication from ectopic pregnancy was significantly higher in women who

were Black (incidence risk ration [IRR] 1.47, 95% confidence interval [CI] 1.43-1.53, $p < 0.0001$, Hispanic (IRR 1.16, 95% CI 1.12-1.21, $p < 0.0001$), Asian (IRR 1.34, 95% CI 1.24-1.45, $p < 0.0001$), American Indian/Alaskan Native (IRR 1.34 95% CI 1.16-1.55, $p < 0.0001$), and Native Hawaiian/Pacific Islander (IRR 1.61, 95% CI 1.39-1.87, $p < 0.0001$) compared with White women in all 14 states (Stulberg et al., 2016). African American women in three states, California, New York, and Illinois, had significantly higher rates than White women (Stulberg et al., 2014).

Socioeconomic influences related to differences in ectopic pregnancy mortality outcomes are well-documented; however, additional factors such as fragmentation in care, defined as evaluation and treatment at two or more healthcare institutions during the same episode of illness (Galanter et al., 2013), have not been fully studied as a possible associated variable with racial/ethnic disparities. Fragmentation in care is attributed to adverse health outcomes, including death, infection, and increased length of hospitalization due to poorly coordinated treatment (Galanther et al., 2013; Zogg et al., 2017). The lack of coordinated care has been observed in conditions such as diabetic ketoacidosis, cardiovascular disease, and asthma. Prior research on the fragmentation of care in ectopic pregnancy is limited. Stulberg et al. (2016) found that low-income minority women receiving Medicaid were more likely to experience complications when care was fragmented. Stulberg et al. (2016) stated that future research conducting a more systematic analysis of ectopic pregnancy and adverse outcomes is recommended to gain a clearer understanding of the individual and public health impact of this problem. A quantitative study using population-level data to examine the differences between racial

groups to determine if fragmentation in care may provide some insight into the observed racial/ethnic variances in morbidity and mortality among women diagnosed with ectopic pregnancy. A population-level database was proposed for use in this study because the analysis of specific variables may provide evidence of the benefits and risks of medical treatments among large numbers of patients treated in a variety of healthcare settings in the community. This evidence, in return, provides the basis for public health professionals and policymakers in the development of clinical guidelines (American Medical Informatics Association, n.d.).

Purpose of the Study

The purpose of this quantitative cross-sectional study was to examine racial/ethnic disparities among females between the ages of 15-44 diagnosed with ectopic pregnancy and determine the role of these differences in ectopic pregnancy morbidity and mortality. The analysis of the relationships of individual characteristics in females diagnosed with ectopic pregnancy outcomes was necessary to identify modifiable conditions that contribute to existing disparities involving ectopic pregnancy morbidity and mortality. Examination of these influences may provide insight regarding contributing factors to ectopic pregnancy outcomes within all ethnic minority and across SES groups in the United States as well as guide race-specific interventions to prevent severe ectopic pregnancy complications.

The dependent variables used to assess complications associated with ectopic pregnancy (operating room services, blood and blood component administration, days of care in intensive care unit, length of stay) and discharge status (death, routine to home,

transfer to a short-term care facility or transfer to a long-term care facility). The independent variable was points of origin (physician/clinical referral, transfer from hospital, transfer from other health facility, or non-healthcare facility point of origin) to assess if care meets the definition of fragmented care, primary expected payer, and race. Control variables were education and income.

Research Questions and Hypotheses

RQ1: Based on administrative claims data, does the risk for complications associated with ectopic pregnancy and discharge status vary by race/ethnicity and primary expected payer among females between the ages of 15-44 in the United States after controlling for income and education?

H_01: The risk for complications associated with ectopic pregnancy and discharge status do not vary by race/ethnicity and expected source of primary expected payer among females between the ages of 15-44 in the United States after controlling for income and education.

H_a1: The risk for complications associated with ectopic pregnancy and discharge status does vary by race/ethnicity and expected source of primary expected payer among females between the ages of 15-44 in the United States after controlling for income and education.

RQ2: Based on administrative claims data, does the risk for complications associated with ectopic pregnancy and discharge status vary by point of origin among females between the ages of 15-44 in the United States after controlling for income and education?

H_02: The risk for complications associated with ectopic pregnancy and discharge status do not vary by point of origin among women ages 15-44 in the United States after controlling for income and education.

H_a2: The risk for complications associated with ectopic pregnancy and discharge status does vary by point of origin among females between the ages of 15-44 in the United States after controlling for income and education.

Theoretical Foundation

The theoretical framework used to guide this study was the theory of fundamental causes theory (TFC). Link and Phelan (1995) developed the TFC to explain the persistence of health disparities particularly, between individuals in low SES and the wealthy. SES is a fundamental cause of health inequalities because it tests four main concepts: 1) SES influences multiple health outcomes, 2) SES is linked to multiple risk factors for morbidity and mortality, 3) there is an association between health and SES because of an inequity in resources, and 4) new conditions that emerge which sustain the association between SES and health are constantly developing (Link, Phelan, & Tehranifar, 2010).The theory concepts were used to interpret the study results to explain the persistent association between SES and health outcomes.

The TFC posits that health disparities between different groups based on specific characteristics such as gender, race, religion, age, and SES, for example, develop due to the inequitable distribution of life-saving information and technology (Link & Phelan, 1995). SES, directly associated with multiple health risk issues and mortality, influences the development of illness (Link & Phelan, 1995). According to the TFC, greater access

to resources that can prevent illness is attained through higher SES. Health-promoting resources such as finances, power, knowledge, status, and beneficial social connections influence which people learn about and access innovative medical advances and treatments earlier in the disease process (Link & Phelan, 1995).

The connection of higher SES to health is established through disease prevention or improved prognosis after the onset of disease (Link & Phelan, 1995). SES may also play a role in the amount of exposure to healthcare providers, institutions, and norms that improve health. According to the TFC, inequalities may impact how patients navigate complex health care institutions, make medical decisions, and manage care, resulting in differences in health outcomes despite being given similar information (Lutfey & Freese, 2005). Using the TFC to examine the causes of health disparities may explain why patients with lower SES or no health care resources may delay seeking treatment for ectopic pregnancy; thus, contributing to higher mortality and morbidity rates in Blacks, Hispanics, and Asian females. Social change interventions must minimize the degree to which flexible resources sustain better health (Polonijo & Carpiano, 2013). Ectopic pregnancy outcomes are thus an important test of the TFC; if specific causes are not identified and addressed through public health interventions; and, if health resources continue to be distributed unequally, disparities will persist (Polonijo & Carpiano, 2013).

Nature of the Study

For this study, I used a quantitative cross-sectional study to examine specific characteristics of the outcome variables. In using this design, the following objectives and specific aims were proposed: to assess racial/ethnic disparities in ectopic pregnancy and

determine the role of these disparities in terms of ectopic pregnancy morbidity and mortality. I examined the association between the dependent variables (operating room services, blood and blood component administration, days of care in intensive care unit, length of stay), and discharge status; and the independent variables (point of origin and race). The control variables were education and income.

A secondary analysis was planned to determine if the risk of mortality and morbidity from ectopic pregnancy varied by race/ethnicity. The proposed sources of information for the study were data from the 2014 National Hospital Care Survey (NHCS) which integrates administrative claims, inpatient demographic, and medical care data previously collected by a sample of emergency departments and outpatient departments throughout the U.S. The study population targeted females 15-44 years of age. The NHCS is a collection of data on patient care in healthcare settings to describe patterns of health care delivery and utilization in the United States.

Literature Search Strategy

To gather literature pertinent to the proposed study, I conducted a review using search engines and databases in the Walden University Library, specifically Academic Search Complete, BioMed Central, CINAHL & MEDLINE Simultaneous Search, EBSCOHost, Google, Google Scholar, PsycINFO, PubMed, SAGE Premier, ScienceDirect, and Thoreau Multi-Database Search. Search terms within these databases and search engines included the *theory of the fundamental cause* (with or without health), *ectopic, or tubal pregnancy* (with or without *disparities*). Also, *ectopic* or *tubal pregnancy* was combined with *minority*, *fragmentation of care*, *morbidity, mortality,*

pregnancy-related, maternal, and *complications*. Selection criteria for peer-reviewed articles were that they were published in English, original research, or review articles, discussions, or descriptions of the identified variables and their relationships to health and health outcomes in the United States. Additional criteria included ectopic pregnancy research studies or discussions or descriptions of the TFC and its application to health and health outcomes.

The literature search did not yield any articles which involved the TFC applied to ectopic pregnancy or pregnancy-related complications, and search results for literature related to fragmentation of care and ectopic pregnancy were sparse. To address this challenge, I reviewed literature about the TFC and its application to explain health disparities in other medical conditions such as cardiovascular disease and orthopedic surgery. I focused on finding population-level data about ectopic pregnancy-related morbidity and mortality. While some of this information was published in the scholarly literature, I also used organizational websites to find census data and vital statistics including the CDC and the WHO.

In this literature review, I present background information to describe pregnancy-related health disparities between White and ethnic minority females as a public health problem. The literature review begins with an overview of historical trends involving ectopic pregnancy morbidity and mortality in the United States. I then discuss the literature and research findings related to key variables for this study based mostly on national and population-level data. I also explain a gap in the literature about fragmentation in care and the lack of research using national hospital discharge to explain

racial/ethnic differences in morbidity and mortality among females diagnosed with ectopic pregnancy in the United States.

Literature Review Related to Key Variables

This section focuses on literature involving the relevant concepts for my study: race/ethnicity, morbidity, mortality, fragmentation of care, and SES in terms of health outcomes among females ages 15-44 diagnosed with ectopic pregnancy in the United States. Although advances in the diagnosis and treatment of ectopic pregnancy have improved between 1980 and 2014, disparities continue to persist within specific socioeconomic, racial, and ethnic groups. In this study, I reviewed existing research involving these factors and their influences related to ectopic pregnancy outcomes.

Race and Ethnicity

Racial and ethnic disparities in ectopic pregnancy morbidity and mortality are well-documented, but the relationship between race and maternal health outcomes is poorly understood. Creanga et al. (2011) conducted an examination of the CDC national surveillance data collection on ectopic pregnancy mortality in the United States. reported average rates from 1980 to 2007, and found the ectopic pregnancy mortality ratio declined by 60.4% among White women (from 0.65 to 0.26 ectopic pregnancy deaths per 100,000 live births), while ectopic pregnancy mortality among Black women remained consistently higher and declined by only 50.8% (from 3.57 to 1.75 ectopic pregnancy deaths per 100,000 live births). Creanga et al. (2015) studied U.S. pregnancy-related deaths in the reporting period between 2006 and 2010 and found 3.1% of deaths were associated with ectopic pregnancies and 4.8% among Black women compared to 1.9%

among White women. Although the specific causes for the differences in mortality rates between racial groups were not well understood, socioeconomic factors, including education, income, and poverty, were contributors for the observed variances (Creanga et al., 2011).

MacDorman et al. (2017) conducted a comparative observational study examining trends in pregnancy-related mortality by sociodemographic factors for 2008-2009 and 2013-2014 for 27 states which included Arkansas, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Michigan, Montana Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, South Dakota, Utah, Washington, and Wyoming. MacDorman et al. (2017) found that 2008-2009, were a total of 29 deaths from ectopic pregnancy complications which accounted for 3.7% of all maternal deaths in the U.S. and from 2013-2014, there were 23 deaths that contributed to 2.5% of all maternal deaths in the U.S. According to MacDorman et al. (2017), the overall maternal mortality rates increased 20% among non-Hispanic Black women between 2008-2009 and 2013-2014 from 46.7 to 56.3 deaths per 100,000 live births. Mortality rates in non-Hispanic white women increased by 28% during the same time. In contrast, rates for Hispanic women were similar to those for non-Hispanic White women in 2008-2009. However, by 2013-2014, the rate for Hispanic women was 22% lower than non-Hispanic White women, while rates remained highest among Black women (MacDorman et al., 2017).

Technologic advances such as clinicians' extensive use of increasingly more sensitive pregnancy tests, ultrasound examination, and laparoscopy have likely

contributed to earlier and more precise diagnosis of ectopic pregnancy (Creanga et al., 2011). The ectopic pregnancy mortality ratio declined by 56.6%, from 1.15 to 0.50 deaths per 100,000 live births between 1980-1984 and 2003-2007, and maybe the result of women receiving and physicians providing education about ectopic pregnancy. Another possible contributor to declines in mortality rates may have resulted from provider implementation of interventions to recognize ectopic pregnancy when women present in healthcare settings for treatment. Lastly, less invasive treatment for unruptured ectopic pregnancies may be additional contributing factors to lower mortality rates (Creanga et al., 2015). Despite a significant decline of 50% in ectopic pregnancy mortality since the 1980s, these advances have not benefited all women equally, as racial and socioeconomic disparities persist (Creanga et al., 2015; Stolberg et al., 2016). To effectively establish interventions to address health disparities, the current study will address an existing gap in the literature to examine whether fragmentation in care is associated with health outcomes due to barriers in timely treatment resulting from the transfer or referral of patients to other facilities for treatment.

Morbidity and Complications

Papillon-Smith et al. (2014) conducted a retrospective population-based study on the association between socioeconomic factors and race examining the management and outcomes of 35,535 inpatient ectopic pregnancies, and found the development of hemoperitoneum in 8,706 patients (24.50%) was the most common complication; Asian race was the sociodemographic variable most predictive of transfusion, and Medicare insurance status for younger women with disabilities was most influential on prolonged

hospitalization. Although ectopic pregnancies occur in all groups of women, specific racial/ethnic groups are more likely to experience complications resulting in blood transfusions and prolonged hospitalization (Stulberg et al., 2016).

Stulberg et al. (2014) conducted a study in women ages 15–44 enrolled in Medicaid in Arizona, California, Colorado, Florida, Illinois, Indiana, Iowa, Louisiana, Massachusetts, Michigan, Minnesota, Mississippi, New York, or Texas in 2004–08 (n=19,135,106), and in California, Illinois, and New York in 2000–03. The results indicated that ectopic pregnancy-associated complications occurred in 11% of all ectopic pregnancies. Controlling for age and state, the risk of any complication was significantly higher among women who were Black, Hispanic, Asian, American Indian/Alaskan, and Native Hawaiian/Pacific Islander, compared with White women. The ectopic pregnancy mortality ratio of the number of deaths to live births was 0.48 per 100,000 live births, similar to those reported in previous U.S. surveillance (Stulberg et al., 2014). Stulberg et al. (2016) found that among Medicaid beneficiaries, the risk for complications (blood transfusion, hysterectomy, other sterilizing surgery), or hospital length of stay (> 2 days) was higher for black, Hispanic, Asian, Native American, and Pacific Island women in comparison to White women. Implications for future research include the identification of interventions that can continue to improve pregnancy outcomes for all women with an emphasis on identifying and addressing contributing factors for racial and ethnic disparities.

Medicaid is a national insurance program in the United States for low-income residents providing coverage for 12% of non-elderly women and 41% of all births

(Kaiser Family Foundation, 2017). To provide insight into contributing factors of ectopic pregnancy outcomes within racial and ethnic minority subgroups in the U.S., I will analyze race and fragmentation in care to determine if these variables are associated with adverse ectopic pregnancy outcomes.

Variation in the Clinical Management between Sociodemographic Groups

Stulberg et al. (2016) studied 191 women discharged from the emergency department of a large urban academic medical center in Chicago following an ectopic pregnancy. Patients whose care was fragmented were more likely to be Medicaid recipients (65.9 vs. 58.8 %) and were more likely to experience a complication (23.8 vs. 18.1 %) compared to those with non-fragmented care. Women with potentially severe conditions require appropriate follow-up to prevent complications resulting in hospitalization or other adverse outcomes.

Ranjit et al. (2017) concluded that racial minority patients were less likely to receive laparoscopic operations for ectopic pregnancy despite universal insurance coverage. Laparoscopic procedures are considered feasible and safe with shorter operative time (Cohen et al., 2013). Among 3,041 patients in the study sample, 1,878 (61.7%) received laparotomy, and 1,163 (38.2%) received a laparoscopic operation within 30 days of diagnosis. Overall, 42.4% of White women underwent laparoscopic surgery compared with 33.1% of Asian women and 34.9% of Black women. Black women had 33% lesser odds of receiving a laparoscopic operation when compared with White women. Ranjit et al. (2017) concluded the need existed for further research studies to determine which factors other than insurance access may contribute to racial disparities

among women with ectopic pregnancy requiring surgical management (Ranjit et al., 2017).

Hsu et al. (2017) conducted a secondary data analysis of insurance claims to study women 15–60 years of age with ectopic pregnancy treated from 2006 to the first quarter of 2015. The study population was derived from 500 acute care hospitals, representing 15% of hospitalizations throughout the U.S. The purpose of the study was to examine the patient demographics and clinical course of treatment in the participants and determine predictors of medical (versus surgical) management of ectopic pregnancy and tubal conservation (salpingostomy versus salpingectomy) among women who underwent surgery. Among the 62,588 women in the study, 49,090 women (78.4%) were treated surgically, and 13,498 women (21.6%) received a less-invasive treatment with the medication methotrexate. Medicaid recipients and the uninsured were less likely to receive medical management with methotrexate than commercially insured patients. Among those who underwent surgery, Black and Hispanic patients were less likely to undergo salpingostomy, conserving tubal surgery than white women, which provided evidence of racial disparities in the management of ectopic pregnancy.

Disparities in health care were documented across SES, as Hsu et al. (2014) observed that Medicaid recipients and uninsured women less frequently underwent salpingostomy than commercially-insured patients. Hsu et al. (2014) concluded there were significant race- and insurance-related disparities associated with treatment and suggested further research on the contributing factors causing the variation of ectopic pregnancy management between women of different racial/ethnic groups. Differences in

the management of ectopic pregnancy in ethnic minorities and between SES groups are likely to result from multiple factors, therefore, conducting a study which examines treatment modalities and individual characteristics of females diagnosed with an ectopic pregnancy may reveal new knowledge to address health disparities.

Fragmentation in Care

Fragmentation in care is defined as the receipt of healthcare in two or more locations during the same episode of illness (Galanter et al., 2013). Care fragmentation involves an interruption in the continuity of care by different health providers (Graboyes et al., 2017) and is associated with poor patient health outcomes (McAlister et al., 2013). Prior studies examined the impact of fragmentation in care on patient health outcomes.

Tsai, Orav, and Jha (2015) examined fragmentation in care among surgical patients who underwent procedures such as cardiovascular repair, colectomy, and hip replacements. A total of 93,062 surgeries were performed during the study period between 2009 and 2011, and 23,278 patients (28%) were readmitted within 30 days of discharge to a different hospital other than one where the initial procedure was performed. Tsai et al. (2015) observed that patients readmitted to hospitals other than the initial care facility had 48% higher odds of mortality than patients who were readmitted to the first hospital. Although there were differences in the distances, patients had to travel to return to the first facility, which may have impacted outcomes, and despite taking those differences into account, care fragmentation in postsurgical patients was associated with a substantially higher risk of death (Tsai et al., 2015).

Stulberg et al. (2016) conducted an exploratory study on the association between fragmentation in care among women with ectopic pregnancy discharged from acute care healthcare facilities with untreated ectopic pregnancies. Creanga et al. (2015) asserted the need for research about the fragmentation of care among women with ectopic pregnancy due to an association of a higher risk of death in this condition than any other obstetric outcome such as live birth, miscarriage, and induced abortion. Fragmentation in care occurs at a higher frequency in ectopic pregnancy management as multiple visits are required to complete treatment, distinguishing this condition from other pregnancy-related complications (Stulberg et al., 2016). The monitoring of human Chorionic gonadotropin levels, the hormone present in a woman's body to indicate the existence of pregnancy, requires serial visits to ensure the resolution of the ectopic pregnancy (American College of Obstetricians and Gynecologists, 2017). Fragmented care increases the likelihood of incomplete care for ectopic pregnancy and a greater probability for women to experience complications (Creanga et al., 2015).

Despite the extensive knowledge of the complexities in the care of ectopic pregnancy and related morbidity and mortality, Stulberg et al. (2016) identified a gap in the research where the process, experience, and outcomes of women with ectopic pregnancy who received fragmented care had yet to be explored. The researchers sought to describe the number, characteristics, and outcomes of fragmented care among women with an ectopic pregnancy in an exploratory study within an urban, academic medical center. In the study, approximately 22% of the patients received fragmented care. The key findings of the study were the lack of documentation from the referring or

transferring institutions, misdiagnosis of ectopic pregnancy at the previous facility, and the lack of available services. Lapses in follow-up care or discharge planning were universal patterns in fragmented care (Stulberg et al., 2016).

Stulberg et al. (2016) found that low-income, minority women receiving Medicaid were more likely to experience complications when care was fragmented. However, a limitation of the study was it being underpowered to observe statistically significant differences between groups who did and not receive fragmented care (Stulberg et al., 2016). The study provided baseline levels for fragmentation and complication rates to serve as a basis to conduct future studies to compare health outcomes across racial and SES groups.

SES

SES is an essential element of individual and public health. SES is the measure of an individual's collective economic and social status and tends to be positively associated with better health. SES is one of the most influential and most persistent predictors of morbidity and mortality, and standard components include education, income, and occupation (Rawshwani et al., 2016). Creanga et al. (2015) found ectopic pregnancy may be more prevalent among women with lower SES compared to the general population. From a historical perspective, the CDC conducted surveillance studies from 1970-1989 in the women within the U.S. and found higher rates of ectopic pregnancy among non-white women compared with whites in all age groups and across all years (rate ratio = 1.4), without controlling for socioeconomic factors (Goldner, Lawson, Xia, & Atrash, 1993).

Stulberg et al. (2011) noted a correlation between Medicaid or self-pay status and more prolonged hospitalizations, even after controlling for other socioeconomic indicators. The study results suggested that both lack of insurance and coverage by Medicaid present barriers to timely care, and ultimately increase both cost and burden on the patient (Stulberg et al., 2011). Patients' neighborhood sociodemographics (zip codes with a higher proportion of African Americans, higher unemployment rates, and urban areas) were found in multivariate analysis to be significantly associated with more extended hospitalizations than others. Stulberg et al. (2011), noting this finding, further suggested that SES affects outcomes of ectopic pregnancy.

Creanga et al. (2015) used data from the Pregnancy Mortality Surveillance System and calculated pregnancy-related mortality ratios by year and age group according to ethnicity. The researchers examined the causes of pregnancy-related deaths by pregnancy outcome from 2006–2010 and compared the causes of pregnancy-related deaths since 1987. Disparities in health outcomes based on race, ethnicity, and socioeconomic factors such as education were noted; for example, among women who died of pregnancy-related complications, a significantly higher proportion of Hispanic than non-Hispanic women had less than 12 years of education (Creanga et al. (2015).

Stulberg et al. (2016) also found an association between fragmented care and health outcomes among women with ectopic pregnancy. The authors also found racial and socioeconomic disparities existed in the study population as low-income, minority women receiving Medicaid were more likely to experience complications when care was fragmented (Stulberg et al., 2016). Although the authors concluded the observed

fragmentation in care might provide information as to why adverse health outcomes are more common in women who received fragmented care, further studies are recommended to identify the full individual and public health impact of this problem. One approach to improve on this research is to utilize population-level data to examine the extent of the problem on a national level to develop interventions to improve outcomes among women with ectopic pregnancy.

Definitions

Blood component administration: Variable that was an indicator of whether a woman experienced an associated complication from an ectopic pregnancy, which required medical treatment for anemia (Stulberg et al., 2016).

Days of care: A variable of intensive care unit (ICU) utilization during pregnancy used to identify severe and near-miss maternal morbidity and complications associated with ectopic pregnancy (Tuncalp et al., 2012).

Discharge status: A code that identifies the patient's physical location at the conclusion of a health care facility encounter such as Routine to home, Home Health/Home hospice care, Admitted as inpatient, Left against medical advice, Transfer to short term facility, Transfer to long term facility, Court/Law enforcement and Dead (Centers for Medicaid and Medicare Services, 2008).

Ectopic Pregnancy: The implantation of a fertilized ovum in any location outside of the uterus (American College of Obstetricians and Gynecologists, 2018). Although ectopic pregnancy occurs in only 1% of all pregnancies, hemorrhage from complications

of ectopic pregnancy is the leading cause of pregnancy-related deaths in the first trimester (Stulberg et al., 2014).

Education: Highest educational level attained (Hayward, Hummer, & Sasson, 2015).

Expected source of payment: The type of entity or organization which is expected to pay the greatest portion of the patient's health care costs for example Medicare, Medicaid, other federal/state/local governments, departments of corrections, private health insurance, self-pay, charity/no charge (Klein et al., 2014).

Income: Total amount of household wages before taxes (Davern et al., 2005).

Length of stay: The median amount of time from hospital admission to discharge (National Quality Forum, 2009).

Operating room services: A variable that indicates a complication resulting from the ectopic pregnancy requiring surgical treatment, for example, Hysterectomy, Salpingectomy, Salpingotomy, and Oophorectomy (Stulberg et al., 2016).

Points of origin: A description of the initial health care facility where the patient presented for treatment such as physician/clinical referral, transfer from hospital, transfer from skilled nursing facility, transfer from another health facility, emergency department, court/law enforcement, and non-health care facility point of origin (Leyenaar et al., 2014).

Race: Physically distinct populations within the same species, for example, White, Black, Asian, and Pacific Islander (Bhopal, 2004).

Assumptions

The primary assumption of this study was that administrative claims were correctly coded to identify ectopic pregnancy cases. The National Hospital Care Survey (NHCS) implemented in 2011, is a new survey which integrates inpatient data formerly collected by the National Hospital Discharge Survey (NHDS) with the emergency department (ED), outpatient department (OPD), and ambulatory surgery center (ASC) data collected by the National Hospital Ambulatory Medical Care Survey [Centers for Disease Control (CDC) National Center for Health Statistics (NCHS), 2015]. The NHCS electronically collects Uniform Bill (UB)–04 administrative claims data from participating hospitals. Another assumption was that hospitals were randomly sampled to participate in the NHCS and resulted in a nationally representative sample of health care facilities in the United States. To examine the research questions, a chi-square test was utilized to explore the variables. The five assumptions of a chi-square test include individual-level data, mutually exclusive categories, study groups must be independent, there are two categorical variables both measured either by nominal or ordinal categories, and

values should be five or more in 80% of the cells (McHugh, 2013). These assumptions were critical to the research study and the analysis of the data for conclusions to be drawn on the target population.

Scope and Delimitations

The scope of this study was to test the relationship between race/ethnicity and fragmentation in care to determine if these factors were associated with adverse ectopic pregnancy outcomes among females 15-44 years of age within the United States.

Additionally, I tested whether race/ethnicity and fragmentation in care predict morbidity and mortality. The focus of the study was based on the documented persistence of disparities in morbidity and mortality despite improvements in the diagnosis, management, and treatment of ectopic pregnancy. Women who are at higher risk for pregnancy-related complications due to their socio-economic status and women from racial/ethnic minority groups are at higher risk of ectopic pregnancy adverse outcomes than white women (Stulberg et al., 2016). Socio-economic influences related to differences in ectopic pregnancy mortality outcomes are well documented. However, additional factors such as fragmentation in care have not been adequately studied as a possible associated variable to the nationally observed racial/ethnic variances (Stulberg et al., 2016). Prior research on the fragmentation of care in ectopic pregnancy is scarce, so this study analyzed the differences between racial groups to determine if fragmentation in care may provide some insight into the observed racial/ethnic variances in morbidity and mortality among women diagnosed with ectopic pregnancy.

In this study, all potential risk factors for morbidity and mortality related to ectopic pregnancy were not accounted for; however, the TFC links persistent health disparities to the inequitable accessibility of health-promoting resources to poorer health outcomes. Hospitals selected for the NHCS represent facilities of similar size, service type, and geographic location to collect nationally representative data on hospital utilization (CDC NCHS, 2015). The study results were potentially generalizable to populations throughout the United States.

Significance, Summary, and Conclusions

This study was to address racial disparities, fragmentation in care, and adverse health outcomes from ectopic pregnancies in the United States. Forty-two out of 191 cases met the criteria for fragmented care, but the study was underpowered to observe statistically significant differences across groups. The proposed research could provide researchers with insight to understand contributing factors of ectopic pregnancy outcomes within sub-groups in this country as well as guide race-specific interventions to prevent severe ectopic pregnancy complications.

The positive social change and public health practice implications of this research may include improved outcomes among ethnic minority and low-income populations, which will ultimately reduce the burden of ectopic pregnancy morbidity and mortality in underserved communities. The study may provide knowledge useful for health professionals and researchers who are searching for a direction to improve health outcomes for all women of child-bearing age. The study results may support the health care practitioners to identify better specific characteristics of women at increased risk for adverse outcomes related to ectopic pregnancy during antenatal visits. The results from the study could also be used in the development of protocols for tracking patients with ectopic pregnancy across multiple care providers from the initial presentation of symptoms to definitive diagnosis and treatment. The proposed study may lead to interventions that can continue to improve pregnancy outcomes for all women with an emphasis on recognizing and confronting the possible causes of racial and ethnic disparities. The implementation of these interventions may potentially contribute to long-term decreases in maternal health complications and further improve ectopic pregnancy

morbidity and mortality rates. As a result of this research, more women could live longer and healthier lives.

Although data collected in previous studies on ectopic pregnancy and the links with social health determinants have been examined and consistently recognized, Stulberg et al. (2016) noted that future research conducting a more systematic analysis of ectopic pregnancy and outcomes is recommended to identify the individual and public health impact of this problem. This topic has been previously assessed only to a minimal extent because, to date, only one study has examined whether fragmented care impacts ectopic pregnancy health outcomes resulting from the transfer or referral of patients to other facilities for treatment. The limitations of the prior research by Stulberg et al. (2016) included being underpowered to observe statistically significant differences between groups who did and did not receive fragmented care; and sampling of a single institution, limiting the ability to generalize the results.

I addressed this gap and built on the body of research in this area by using population-level data to test point of origin (to assess if care meets the definition of fragmented care), expected source of primary expected payer, and race as independent variables, with operating room services, blood and blood component administration, days of care in intensive care unit, length of stay >2 days, (to establish morbidity associated with ectopic pregnancy) and discharge status (death, routine to home, transfer to a short-term care facility or transfer to long-term-care facility) as dependent variables. The findings from this study could close this knowledge gap by examining the stated variables to provide researchers with insight to understand contributing factors of ectopic

pregnancy outcomes within sub-groups in this country as well as guide race-specific interventions to prevent severe ectopic pregnancy complications. The analysis of the relationships of individual-level factors with ectopic pregnancy outcomes was necessary to identify modifiable elements that contribute to existing disparities in ectopic pregnancy morbidity and mortality (Stulberg, Dahlquist, Jarosch, & Lindau, 2016).

In conclusion, there was a gap in the literature for research exploring associations between race/ethnicity and fragmentation in care to determine if these factors are associated with increased risk for morbidity and mortality among women diagnosed with ectopic pregnancy, especially women of specific racial and ethnic minority groups. A systematic analysis of ectopic pregnancy and outcomes is recommended to identify the individual and public health impact of this problem. Successful reduction of pregnancy-related mortality and health disparities may result from improvements in ectopic pregnancy outcomes by studying processes of care and determinants of health to advance the health status of all women. Section 2 provides the rationale behind the research design and data collection methods to reinforce the significance and need for this scholarly project.

Section 2: Research Design and Data Collection

Introduction

The purpose of this study was to examine race/ethnicity and fragmentation in care to determine if these factors are associated with adverse ectopic pregnancy outcomes. The dependent variables were operating room services, blood and blood component administration, days of care in the intensive care unit, length of stay, and discharge status (death, routine to home, transfer to a short-term care facility, or transfer to a long-term care facility). The independent variables were the point of origin (physician/clinical referral, transfer from hospital, transfer from another health facility, or non-healthcare facility point of origin) and race. The control variables were education and income.

In this section, I discuss the design and rationale for this study. I also present the methodology, target population, and sample size, justified by using power analysis to determine that the sample size was appropriate and applicable to the target population of women ages 15-44 in the United States diagnosed with ectopic pregnancy. The proposed data set was collected using the 2014 NHCS which was developed by the CDC National Center for Health Statistics. In this section, I describe the proposed data analysis plan including the intended applied statistical tests and procedures I used to analyze the data, test rationale, and how the results will be interpreted. This section concludes with threats to validity and ethical procedures, as defined by the NHCS.

Research Design and Rationale

For this study, I used a quantitative cross-sectional design to examine racial/ethnic disparities in ectopic pregnancy and determine the in terms of ectopic pregnancy

morbidity and mortality. I tested the association between the dependent variables operating room services, blood and blood component administration, days of care in ICU, length of stay, and discharge status and the independent variables point of origin, and race. The control variables were education and income.

A qualitative research redesign was selected for this study for several reasons. Quantitative research designs are utilized by researchers to objectively test hypotheses through the examination of the relationships between variables (Creswell & Creswell, 2018. A qualitative design was ideal for this study because it facilitates the deductive testing of theories. This design incorporates protections against bias, controls for alternate explanations, and allows for the replications and generalization of research findings (Creswell & Creswell, 2018).

Quantitative researchers use statistical techniques and investigate the relationships between events and factors that influence or cause them and a systematic, objective, and formal process for obtaining measurable data. The quantitative study design was selected for this study because it has the potential to provide information and statistics on the relationship between ectopic pregnancy morbidity and mortality and the persistence of disparities in females of ethnic minority groups and low SES in the United States. The findings from this study may provide evidence to support public health professionals in identifying individual factors that place women at increased risk for ectopic pregnancy and the ability to increase ectopic pregnancy prevention activity in populations that may be more susceptible to the condition and its complications.

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A cross-sectional design was selected for this study because of its many advantages. In addition to being cost-effective, the design requires minimal resources, and it provides a snapshot of the population under study (Frankfort-Nachmias et al., 2014). This design examines the relationship among variables for a given population, and it also allows the researcher to make inferences about the population at a specific point in time (Creswell & Creswell, 2018). This design has been established to be beneficial to other researchers because it can be used to record the incidence of health problems such as ectopic pregnancy (Stulberg et al., 2016; MacDorman et al., 2017). Based on the use of the cross-sectional design in prior studies, I selected this design to explore the relationship between the dependent and the independent variables.

Although previous research has been conducted using the same variables in this study, such as SES, race, and length of hospitalization, this study may be the first to analyze the association between the fragmentation of care and adverse outcomes in ectopic pregnancy in the United States. By using the cross-sectional design, the study results may help to determine if there is an association between the study variables and racial/ethnic disparities to predict morbidity and mortality among women with ectopic pregnancy. The study findings resulting from the use of a cross-sectional design may result in new knowledge for public health professionals, health care providers, and patients to develop appropriate preventive measures to decrease complications in all women, especially females within lower SES and racial minorities.

The statistical plan for the proposed study included first a Chi-square test for homogeneity to assess the distribution for morbidity and mortality across racial/ethnic

categories. A Chi-square statistical analysis was selected to analyze group differences using dependent variables measured at nominal levels to determine if a significant association exists. The second step was to include a multinomial logistic regression to investigate whether race/ethnicity and fragmentation in care predict morbidity and mortality. The rationale for selecting this statistical test was based upon its suitability to support the aim of my study.

A secondary analysis was conducted to determine if the risk of mortality and morbidity from ectopic pregnancy varies by race/ethnicity. Sources of information for the study included data from the 2014 NHCS, which integrates administrative claims and inpatient data previously collected by the National Hospital Discharge Survey, emergency department, and outpatient departments for females who are 15-44 years of age.

Methodology

Target Population

The target population for the study was women between the ages of 15 and 44 diagnosed with ectopic pregnancy in the United States in 2014. According to Panela, Phillips, and Brady (2015), an ectopic pregnancy occurs in 1% of all pregnancies in the United States. Data specific to the target population was extracted from NHCS to include person-level information and encounter-level information from all sources of care including inpatient, outpatient, ambulatory surgery centers, and emergency departments.

Sampling and Sampling Procedures

According to Williams, Goose, and DeFrances (2018) the target domain of NHCS is inpatient discharges, also called inpatient hospitalizations, and in-person visits made to ED and OPD including ASC, in noninstitutional, nonfederal hospitals in the 50 states and the District of Columbia that have six or more staffed inpatient beds. The 2014 NHCS sample contains 581 hospitals: 506 acute care hospitals and 75 other specialty hospitals, including children's, psychiatric, long-term acute care, and rehabilitation hospitals (Williams et al., 2018). In the 2014 NHCS data collection, 94 hospitals out of the 581-hospital sample provided inpatient claims data, and 88 of the 94 hospitals that provided inpatient data also provided ambulatory claims data (a response rate of 16.2% and 15.1%, respectively) (Williams et al., 2018). Of the 94 hospitals providing inpatient claims, 92% were general acute care hospitals, 4% were children's hospitals, 3% were psychiatric hospitals, and 0.4% were rehabilitation or long-term acute care hospitals (Williams et al., 2018). Of the 88 hospitals providing ambulatory claims, 88% were general acute care hospitals, 8% were children's hospitals, 2% were psychiatric hospitals, and 2% were rehabilitation or long-term acute care hospitals (Williams et al., 2018). Participating hospitals were asked to provide all encounters in inpatient and ambulatory settings during the 2014 calendar year. The unweighted total number of encounters was approximately 1.7 million inpatient discharges or inpatient hospitalizations (1.5 million non-newborn inpatient discharges), and 4.5 million ED visits (Williams et al., 2018). The specific number of ectopic pregnancy diagnoses in 2014 was determined upon examination of the data set.

NHCS electronically collects Uniform Bill (UB)–04 administrative claims data from participating hospitals. Physician and patient identifiers and data on patient demographics, diagnoses, procedures, and revenue codes are included in the claims. The NCHS has developed a process to identify duplicate claims for the same discharge or visit within a health care facility (Williams, Gousen, & DeFrances, 2018). The NHCS utilizes personally identifiable information (PII) on the claims to link patient data across hospital settings and with other data sources, such as the National Death Index (NDI) (CDC NCHS, 2015). The establishment of the PII provides the capability to track patients during an episode of care by linking records within the same health care facility and will be invaluable to my study to trace women diagnosed with ectopic pregnancy from an initial visit to the ED, admission to the hospital, and discharge from the hospital. The NHCS linkage to the NDI allows researchers to conduct numerous outcome studies (e.g., 30-, 60-, and 90-day mortality after discharge from a hospital designed to investigate factors that are related to health care mortality (Williams, Gousen, & DeFrances, 2018). These characteristics of the NCHS support the aim and purpose to examine specific variables that may impact ectopic pregnancy outcomes.

The procedure to gain access to the 2014 NHCS was detailed in the Centers for Disease Control National Center for Health Statistics Website (CDC NHCS). Access to the NHCS will be granted through the National Center for Health Statistics Research Data Center (RDC), and researchers are required to submit a research proposal outlining the need for the data. Once approved, the RDC assists researchers in creating a data file specific to the proposed research questions (CDC NCHS, 2015).

I used a power analysis calculator to determine the appropriate sample size for this study. According to Creswell & Creswell (2018), power is the probability of rejecting the hypothesis and suggested that a standard power should be at least 80%, which refers to an 80% chance of finding results that are significant within the study population. For this study, the minimum sample size of 143 respondents is required based on the calculations using G*Power 3.1 Statistical Power Analysis for a Chi-square Goodness of Fit analysis two-tailed analysis with 0.80 power (Faul, Erdfelder, Lang, & Buchner, 2007). A medium effect size of 0.3 was used in the calculation but not based on a previous study.

Instrumentation and Operationalization of Constructs

The NHCS was developed in 2011 by the CDC NCHS and replaced the National Hospital Discharge Survey last completed in 2010. The NHCS aims to provide more accurate and reliable health statistics on how conditions such as ectopic pregnancy are diagnosed and treated across the continuum of care in U.S. hospitals (Williams, Gousen, & DeFrances, 2018). Patient identifiers allow for the study of 30-, 60-, and 90-day mortality among hospital discharges and ED visits, while the collection of services received for example use of the intensive care unit [ICU] and diagnostic services allows for analysis of hospital utilization (Williams, Gousen, & DeFrances, 2018). According to CDC NCHS (2015), the NHCS was implemented in 2011 with the unweighted data sets for 2013 and 2014 currently available to researchers. The NHCS describes national health care delivery usage in hospital-based settings, including inpatient departments, emergency departments (EDs), and outpatient departments (OPDs), including hospital-

based ambulatory surgery. Additionally, NHCS collects patient-level identifiers which allow a patient's episodes of care to be linked between various hospital inpatient and outpatient settings, as well as to databases such as the National Death Index, providing a complete depiction of patient care (CDC NCHS, 2015) These attributes of the data set will support the analyses of the variables to answer the research questions.

According to CDC NCHS (2015), data related to patients and their care are collected from a sample of hospitals to provide national estimates of service use and allow researchers to study relationships between health care institutions and delivery of health care. A sample of hospitals in the United States are being recruited to participate in the survey and (1) complete a short interview to determine eligibility for survey inclusion (2) provide data on all inpatient stays and ambulatory visits (ED and OPD) from their electronic health records (EHR), Uniform Bill (UB)-04 administrative claims data or an electronic file in the same format that was submitted to the state and (3) allow data abstraction of clinical information on a sample of ambulatory visits (CDC NCHS, 2015)

Operationalization

Blood, blood component administration: A nominal, dependent variable representing an International Classification of Disease (ICD) 9th revision revenue code that is an indicator of whether a woman experienced an associated complication from an ectopic pregnancy requiring blood and blood product administration. 1=Yes 2=No.

Days of care in intensive care unit: An interval-level, dependent variable of the number of days of care in the intensive care unit (ICU) utilization used to identify severe

and “near-miss” maternal morbidity and complications associated with ectopic pregnancy.

Discharge status: A nominal, dependent variable that identifies the patient’s physical location at the conclusion of a health care facility encounter such as 1=Routine to home, 2=Home health/Home hospice care, 3=Admitted as inpatient, 4=Left against medical advice, 5=Transfer to short term facility, 6=Transfer to long term facility, 7=Court/Law enforcement and 8=Dead 9=Other health care facility.

Ectopic Pregnancy: The diagnosis and chief reason for the encounter. Identified by ICD-9 codes 633.xx. Females ages 15-44 diagnosed with an ectopic pregnancy were included in the study.

Education: An ordinal, confounding variable corresponding to an individual’s education level.

Expected source of primary expected payer: The type of entity or organization which is expected to pay the greatest portion of the patient’s health care costs.

Income: A confounder variable measured at the interval-ratio level for the patient’s total amount of household wages before taxes.

Length of stay: An interval-level dependent variable measuring the number of days from hospital admission to discharge.

Operating room services: A dichotomous variable, dependent variable (1=Yes, 2=No), which indicates a complication resulting from the ectopic pregnancy requiring surgical treatment.

Point(s) of origin: A categorical, independent variable indicating the initial health care facility where the patient presented for treatment such as 1=Physician/Clinical referral, 2=Transfer from hospital, 3=Transfer from Skilled Nursing Facility, 4=Transfer from another health facility, 5=Emergency department, 6=Court/Law enforcement, and 7=Non-health care facility point of origin.

Race: Categorical (nominal) variable corresponding to an individual's ethnicity or race. 1=White,2=Black or African American, 3=Hispanic or Latino, 4=Asian, 5=Native Hawaiian, or Pacific Islander.

Data Analysis Plan

I planned to analyze the 2014 NHCS secondary data using SPSS version 24. I validated the analyses using the validation functions within SPSS v.24. I conducted descriptive studies of the variables and recoded the variables as necessary to ensure alignment with the research questions. I conducted data cleansing, which served to identify and correct errors to minimize their impact on study results (Van den Broeck, Cunningham, Eeckels, & Herbst, 2005). Data cleansing requires an examination of the integrity and reliability of information or data used in the study and research. I examined all data used in the analysis to ensure all data was valid.

For the study, I planned to conduct statistical analyses to include a Chi-square test for homogeneity to assess the distribution for the dependent variables measuring morbidity (operating room services, blood and blood component administration, days of care in intensive care unit, length of stay >2 days) and discharge status (death, routine to home, transfer to short-term care facility or transfer to long-term-care facility) across

racial/ethnic categories. The second step was to include a multinomial logistic regression to investigate whether race/ethnicity and fragmentation in care and predicted morbidity and discharge status.

RQ1: Based on administrative claims data, does the risk for complications associated with ectopic pregnancy and discharge status vary by race/ethnicity and expected source of primary expected payer among females ages 15-44 in the United States after controlling for income and education?

$H_0 1$: The risk for complications associated with ectopic pregnancy and discharge status do not vary by race/ethnicity and expected source of primary expected payer among females ages 15-44 in the United States after controlling for income and education.

$H_a 1$: The risk for complications associated with ectopic pregnancy and discharge status does vary by race/ethnicity and expected source of primary expected payer among females ages 15-44 in the United States after controlling for income and education.

RQ2: Based on administrative claims data, does the risk for complications associated with ectopic pregnancy and discharge status vary by point of origin among females ages 15-44 in the United States after controlling for income and education?

$H_0 2$: The risk for complications associated with ectopic pregnancy and discharge status do not vary by point of origin among females ages 15-44 in the United States after controlling for income and education.

H_a2: The risk for complications associated with ectopic pregnancy and discharge status does vary by point of origin among females ages 15-44 in the United States after controlling for income and education.

To address the research questions, Chi-square tests were conducted. The Chi-square is an appropriate analysis to use when the research is interested in the strength of a relationship or association between two nominal variables (Howell, 2013). The Chi-square analyses assessed if statistically significant associations existed between the dependent variables: operating room services, blood and blood component administration, days of care in intensive care unit, length of stay >2 days, (to establish morbidity associated with ectopic pregnancy) and discharge status (death, routine to home, transfer to short-term care facility or transfer to long-term-care facility) and the independent variables point(s) of origin , expected source of primary expected payer, and race. Control variables were education and income.

I planned to perform a multinomial logistic regression to model the significance of the findings of the dependent variables, with the independent variables, to determine whether to either accept or reject the null hypothesis using a significance level of $p < 0.05$. Additionally, the regression model provides coefficient outputs for each independent variable to predict the probability of morbidity and mortality across racial groups and the source of the primary expected payer. The regression results were to be reported in terms of relative risk ratios to predict morbidity and mortality in women diagnosed with ectopic pregnancy.

Threats to Validity

The data contained within the NHCS presents an ideal opportunity to help researchers to answer critical questions of interest to public health professionals, including health disparities in services provided to population subgroups in the United States (CDC NCH, 2015). The method of data collection entails the electronic collection of administrative claims data from participating hospitals (Levant, Chari, & DeFrances, 2016). The method of data collection and the theoretical analysis of the study findings pose threats to internal and external validity related to this study.

Creswell & Creswell (2018), described threats to internal validity as experimental processes, treatments, and experiences of the participants that threaten the researcher's ability to draw accurate inferences from the data related to the population. Selection is a type of internal validity threat where participants can be selected who have characteristics that predispose them to have specific outcomes. This threat may be minimized through the random selection of participants, so features have the probability of being equally distributed among the study groups (Creswell & Creswell, 2018). The NCHS randomly selected 581 hospitals in the U.S. to submit their claims data for inclusion in the NHCS; however, only 91 hospitals participated and may have resulted in an over- or under-representation of facilities where ectopic pregnancies were diagnosed.

External validity threats may result when researchers draw incorrect inferences from the sample data to other persons, other settings, and past or future situations (Creswell & Creswell, 2018). The characteristics of individuals selected for the sample, the uniqueness of the environment, and the timing of the study are the potential contributors to the threats to external validity. For this study, a possible threat to external

validity may occur when the generalizing the findings beyond the groups in the experiment to other racial or social groups not under investigation, to settings not examined, or to past or future situations (Creswell & Creswell, 2018). The NHCS collects Uniform Bill (UB)–04 administrative claims data from participating hospitals (Levant, Chari, & DeFrances, 2016). UB–04 is the administrative claim required by the Centers for Medicare & Medicaid Services (CMS) and most commercial insurance payers. Threats to external validity are possible if the study results are generalized to populations that are not representative of the sample. For example, if the data set contains a more significant number of rural hospitals, women diagnosed with ectopic pregnancy in those geographical areas may be more likely to receive fragmented health care due to limited resources at the initial facility the women present for health care. Health outcomes for women in rural settings cannot be generalized to women in urban environments as distance and travel to health care facilities may result in poorer outcomes (Tsai et al., 2015).

Ethical Procedures

There were no ethical concerns connected to data collection. Data abstraction from electronic health records and administrative claims data did not require informed consent. Physicians' and patients' identities were protected through the assignment of identifiers, which could not disclose actual names, addresses, etc. allowing for anonymity and the maintenance of confidentiality.

According to the CDC (2015), the NCHS and its representatives are required by law to keep all data regarding patients and facilities strictly confidential and to use these

data only for research and statistical purposes as stated by Section 308(d) of the Public Health Service Act [42 United States Code 242m (d) and Section 513 of the Confidential Information Protection and Statistical Efficiency Act (PL-107-347]. All NCHS contractors and agents are required to sign legally binding agreements to comply with all requirements for safety measures, access, and disclosure (CDC NCHS, 2015). NCHS staff and its agents are required to complete annual training on confidentiality, including reporting any breach of confidentiality-- and sign annual non-disclosure agreements confirming the commitment to abide by all rules and regulations to maintain data confidentiality (CDC NCHS, 2015). Contractor organizations are required to meet the equivalent administrative, physical, and technical precautions as NCHS and to agree in writing to the same restrictions and obligations concerning protecting the confidential information collected in the NHCS (CDC NCHS, 2015). Physician and personal patient identifiers are not included in the NHCS to safeguard privacy.

Summary

For this study, I used a quantitative cross-sectional design to examine specific characteristics of the outcome variables. This design supported my research to assess racial/ethnic disparities in ectopic pregnancy and to determine the role of racial/ethnic differences in ectopic pregnancy morbidity and mortality. I planned to examine the association between the variables operating room services, blood and blood component administration, days of care in intensive care unit, length of stay, and discharge status and the independent variables expected source of the primary expected payer, point of origin, and race.

Chi-square and multinomial logistic regression analyses were to be conducted to answer the research questions. The threats to validity were to be minimal due to the random collection of administrative claims data from a sub-set of healthcare institutions. The data collection was ethical and met the requirements of protecting the privacy of human subjects. Information within the 2014 NHCS will be provided confidentially from the NCHS and is designed only for research purposed as outlined in Section 308(d) of the Public Health Service Act, 42 U.S. Code 242(d), the Privacy Act of 1974 (5 U.S. Code 552a), and the Confidential Information Protection and Statistical Efficiency Act (5 U.S. Code). Section 3 discusses the results and findings from the data analysis.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative cross-sectional study was to examine racial/ethnic disparities among women diagnosed with ectopic pregnancy and determine if race, insurance status, number of procedure codes, and number of diagnoses are associated with length of stay in females ages 15-44 diagnosed with ectopic pregnancy. The research questions for this study were:

RQ1: Based on administrative claims data, does the risk for complications associated with ectopic pregnancy and discharge status vary by race/ethnicity and expected source of primary expected payer among women ages 15-44 in the United States after controlling for income and education?

$H_0 1$: The risk for complications associated with ectopic pregnancy and discharge status do not vary by race/ethnicity and expected source of primary expected payer among women ages 15-44 in the United States after controlling for income and education.

$H_a 1$: The risk for complications associated with ectopic pregnancy and discharge status does vary by race/ethnicity and expected the source of primary expected payer among women ages 15-44 in the United States after controlling for income and education.

RQ2: Based on administrative claims data, does the risk for complications associated with ectopic pregnancy and discharge status vary by point of origin among women ages 15-44 in the United States after controlling for income and education?

H_02: The risk for complications associated with ectopic pregnancy and discharge status do not vary by point of origin among women ages 15-44 in the United States after controlling for income and education.

H_a2: The risk for complications associated with ectopic pregnancy and discharge status does vary by point of origin among women ages 15-44 in the United States after controlling for income and education.

In this section, I present the results of secondary data analysis. I analyzed the 2014 NIS secondary data using SPSS version 24. I validated the analyses using the validation functions within SPSS. I conducted descriptive studies of the variables and recoded the variables as necessary to ensure alignment with the research questions. I performed data cleansing, which served to identify and correct errors to minimize their impact on study results. I examined all data used in the analysis to ensure they were valid.

I recoded the selected variables and manipulated them to answer the research questions. I conducted normality testing and performed binary analyses and bivariate analysis. I performed a multiple logistic regression using SPSS on the independent variables to determine if statistically significant associations existed with the dependent variables. I conclude this section with a summary of the findings from the data analyses.

Data Collection of Secondary Data Set

For this study, I used the National Inpatient Sample (NIS), part of the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project (HCUP). The NIS is the largest all-payer inpatient care database in the United States, containing demographic and clinical information abstracted from hospital discharge records.

Initiated in 1988, the NIS is published annually and provides information on approximately 7 million hospital visits from about 1000 hospitals, sampled to approximate a 20% stratified sample of U.S. community hospitals (HCUP, 2016). Hospitals are divided into strata based on region, urban/rural location, teaching status, number of hospital beds, and ownership. According to HCUP (2016), sampling probabilities are proportional to the number of hospitals contained in each stratum. The unit of analysis is individual hospitalizations, and the NIS does not include personal patient identifiers. In addition to general patient demographics, the NIS provides discharge diagnoses/procedure codes from the ICD-9-CM. Patient records include at least one primary diagnosis and may contain a maximum of 24 secondary discharge diagnoses and up to 15 procedural codes.

Researchers can make national estimates regarding healthcare use, access, charges, quality, and outcomes based on the NIS data. The 2014 NIS contains data from 44 states and the District of Columbia, representing 96% of the U.S. population and 94% of discharges from U.S. community hospitals (HCUP, 2016). The 2014 NIS is a sample of discharges and is derived from all participating hospitals. It is a self-weighted sample design, much like simple random sampling, and guarantees that the sample is representative of the population.

Discrepancies

There were several discrepancies regarding the secondary data from the original data analysis. I used the 2014 NIS instead of the NHCS. The NHCS is a restricted data set maintained by the CDC NCHS, and several challenges were experienced obtaining

the data set for the study. The change in the data set resulted in the modification of several study variables that were not present in the NIS. For example, the variables days in intensive care and point of origin were not available in the NIS. For the NIS dataset, blood administration and major operating room procedure had to be determined based on whether a patient's chart contained an ICD-9 procedure code indicating whether blood or blood products were transfused and the number of procedures. To determine fragmentation in care, the alternative variables TRAN_IN and TRAN_OUT were examined because they indicate if a patient was either transferred into or out of the reporting hospital, thus determining if care was fragmented. The use of the TRAN_IN and TRAN_OUT variables resulted in an additional discrepancy regarding the study. I observed there were a minimal number of cases (n = 53) where the patients were transferred in or out of the presenting facility. Therefore, TRAN_IN and TRAN_OUT were excluded as variables from the analysis. Additionally, several of the proposed variables did not meet the assumptions of the Chi-square analysis and could not be analyzed by this statistical method. The actual use of different statistical analyses in this study such as independent t-tests and multiple linear regression, were, therefore, deviations from the original statistical plan.

The sample for the analysis was derived from the 2014 NIS database, which included over seven million patient hospitalizations. Data were screened for female patients ages 15-44 with a diagnosis code '633' in one of the ICD categories for ectopic pregnancy and resulted in 2,670 participants with an ectopic pregnancy. Due to the low frequency of Native Americans (n = 9) and 35 outliers, the final sample included 2,626

participants. White participants made up the largest racial/demographic group (34%), while a majority of the participants (37%) were in the $1 – 24,999 income quartile, with many participants (45%) who had Medicaid as a form of the primary expected payer. There was a low frequency of patients who died during hospitalization (n=3); therefore, these data were excluded in the study. Table 1 displays the frequency data.

Table 1

Frequency Distributions for Research Sample

Variables	**Categories**	**N**	**%**
Race/Ethnicity	Asian/PI	142	5.0
	Black	793	30.0
	Hispanic	675	26.0
	Other	130	5.0
	White	886	34.0
Income Quartile	$1 – 24,999	974	37.0
	$24,999 – 34,999	702	27.0
	$34,999 – 44,999	565	21.0
	$50,000 or more	385	15.0
Primary expected payer	Medicare	40	1.5
	Medicaid	1180	45.0
	Private Insurance	955	36.0
	Self-Pay	954	13.5
	No Charge	24	1.0
	Other	73	3.0
Procedures	One	1132	43
	Two or More	1494	57
	Research Sample	2,626	100.0

Results

RQ1: Is there an association between race, primary expected payer, income, number of procedure codes on record, number of diagnoses on record, and length of stay

among females 15-44 in the United States with ectopic pregnancy after controlling for income and education?

In order to answer RQ1, I conducted a multiple linear regression analysis to examine if length of stay (measured in days) was predicted by (1) number of procedures on record, (2) number of diagnoses on record, (3) income, (4) race/ethnicity, and (5) primary expected payer. Length of stay, the number of procedures, and diagnoses on the record are continuous variables, and Table 2 contains descriptive statistics for these variables.

Table 2

Length of Stay, Procedures, Age, Diagnoses Data

	N	Mean	SD
Length of Stay	2626	1.62	1.10
Procedures	2626	1.84	1.21
Age	2626	29.41	5.93
Diagnoses	2626	3.58	2.73

Race/ethnicity and primary expected payer are categorical, and income is an ordinal variable; race/ethnicity, primary expected payer, and income were dummy coded. The data met linearity and homoscedasticity assumptions as exhibited in the studentized residuals versus unstandardized predicted values plot (see Figure 1).

Additionally, there was independence of residuals, as assessed by a Durbin-Watson statistic of 1.67, and the model exhibited no multicollinearity, as evaluated by tolerance values greater than 0.1 for all the predictor variables. There were 49 cases

where the studentized deleted residuals were greater than ±3 standard deviations; therefore, the cases were removed from the analysis.

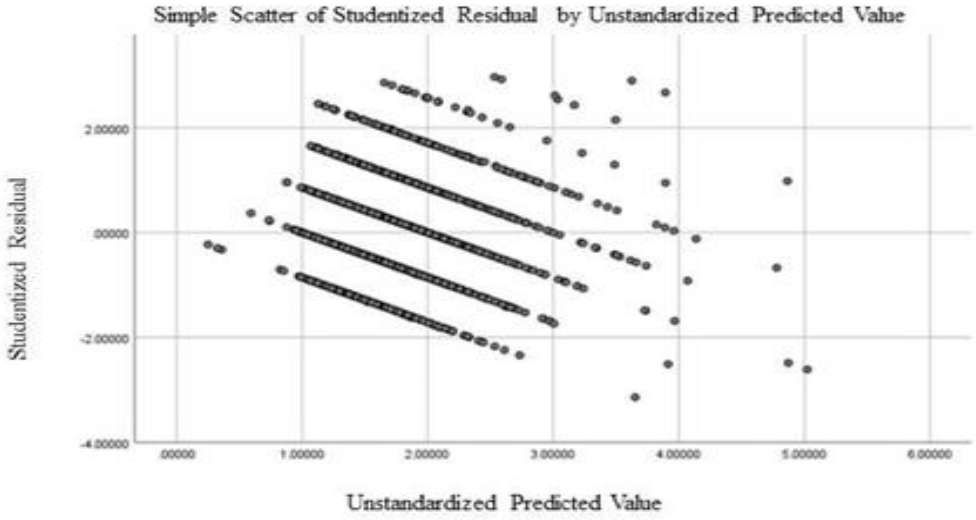

Figure 1. Scatterplot assessing linearity between independent variables and length of stay

Also, the analysis showed no leverage values greater than 0.2, and values for Cook's distance were (<1). The assumption of normality was met, as assessed by a Q-Q plot (see Figure 2) and a histogram of the residuals (see Figure 3).

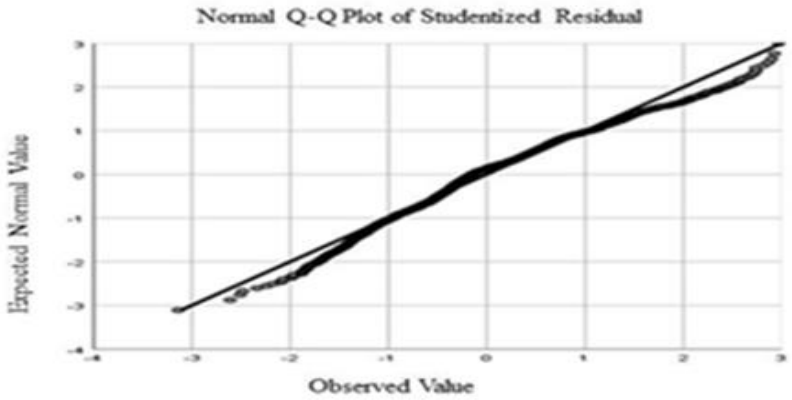

Figure 2. Q-Q plot assessing normality for independent variables and length of stay

In the multiple regression model, I found statistically significant predictors for the length of stay, F (16,634) = 29.53, p < .001, R2 = .15, and therefore, I rejected the null hypothesis. The reference category was those in income quartile $1 – 24,999, White, and those whose primary expected payer was Medicaid. Holding all variables in this model constant, the number of procedures, number of diagnoses, income quartile of $45,000 or more, and the Black racial/ethnicity were all significant predictors of length of stay. The results indicated that holding all variables in this model constant, for every standard deviation unit increase in the number of procedures (β = 0.13, p <.001), the length of stay also increased by 0.13 units.

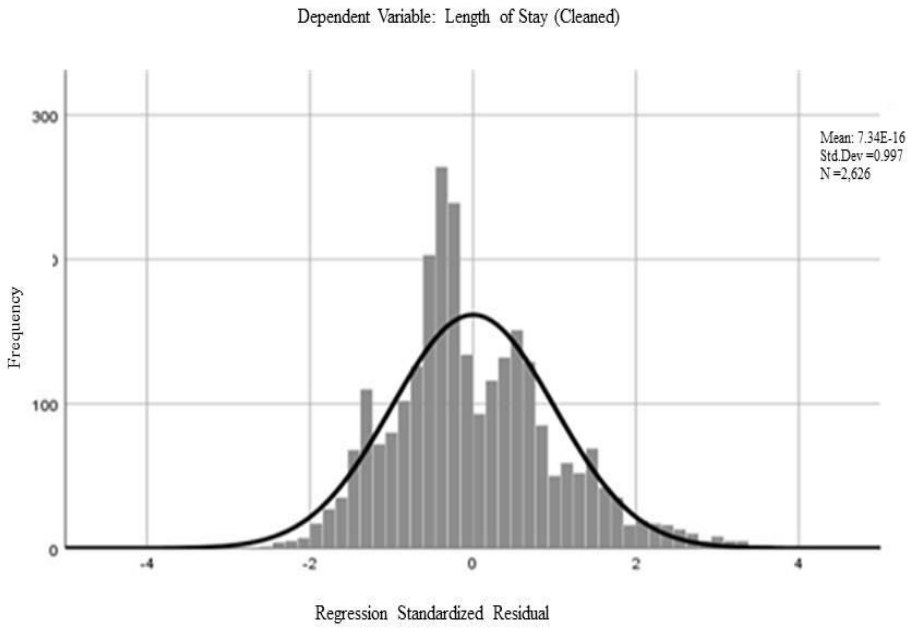

Figure 3. Histogram assessing normality between the independent variables and length of stay.

Additionally, for every standardized deviation unit increase in number of diagnoses (β = 0.37, p <.001) length of stay increased by .37 units and for every standardized deviation unit increase for the Black racial/ethnicity (β = 0.05, p < .05)

length of stay increased by 0.05 units. Finally, for every standardized increase in income quartile of $45,000 or more (β = .08, p < .001) length of stay decreased by -0.08 units. In Table 3, I present the regression analysis results.

Table 3

Summary of Multiple Regression Analysis Predicting Length of Stay (N = 2,626)

Variable	*B*	*SE B*	*B*	95% CI	
Constant	0.94	0.63		Lower	Upper
Procedures	0.11	0.18	0.13***	0.08	0.15
Diagnoses	0.15	0.01	0.37***	0.13	0.17
Income Quartile $25,000 - 34,999	-0.05	0.05	-0.02	-0.15	0.06
Income Quartile $35,000 - 44,999	-0.01	0.06	-0.04	-0.12	0.10
Income Quartile $45,000 or more	-0.23	0.07	-0.08***	-0.36	-0.11
Black	0.12	0.05	0.05*	0.02	0.22
Hispanic/Latino	0.08	0.05	0.03	-0.03	0.18
Asian/Pacific Islander	0.06	0.09	0.01	-0.12	0.24
Medicare	-0.22	0.17	-0.02	-0.35	0.30
Private Insurance	-0.16	0.05	-0.07	-0.11	0.08
Self-Pay	-0.11	0.06	0.03	-0.23	0.02
Other Payment	0.15	0.12	0.02	-0.10	0.39
F		29.53			
R^2		0.15			

Note. *p < .05, **p < .01, ***p < .001

RQ2: Does age, the number of diagnoses, and length of stay differ between females 15-44 diagnosed with ectopic pregnancy in the United States who have one procedure code versus two or more procedure codes?

I used independent samples t-tests to assess whether significant differences existed between ectopic pregnancy participants who had one procedure code of record (n = 1132) and between ectopic pregnancy participants who had two or more procedure codes of record (n = 1494) for age, the number of diagnoses, and length of stay. For age, there was a statistically significant difference ($p < .001$) with a Cohen's d effect size of .14 with participants having two more procedure codes on record having a higher age at admission at 29.77 than participants with one procedure code on record. The number of diagnoses was also statistically significant ($p < .001$), with participants having two or more procedure codes on record having 4.02 diagnoses compared to 3.01 for those with only one procedure with a Cohen's d effect size of .38. Length of stay was also statistically significant ($p < .001$), with a mean difference of .34 and a Cohen's d effect size of .32 with participants with two more procedures staying a total of 1.77 days in the hospital compared to participants with one procedure staying 1.43 days; therefore, I rejected the null hypothesis. Table 4 presents the results from the independent samples t-tests.

Table 4

Results of T-Tests and Descriptive Statistics, 95% CI for Mean Difference

	Group							
	One Procedure			Two or More				
	M	*SD*	*n*	*M*	*SD*	*n*	95% CI	t
Age***	28.95	5.82	1132	29.77	5.98	1494	-1.28, -0.36	-3.69
Diagnoses**	3.01	2.37	1132	4.02	2.90	1494	-1.21, -0.80	-9.52
Length of Stay***	1.43	0.99	1132	1.77	1.16	1494	-0.43, -0.26	-8.05

Summary

I presented the results of the 2014 NIS used to evaluate the relationship between race, primary expected payer, income, number of procedure codes on record, number of diagnoses on record, and length of stay among females between the ages of 15 and 44 in the United States with ectopic pregnancy. A total of 2,626 records were examined. I conducted a multiple linear regression to determine if there was an association between race, primary expected payer, the number of procedure codes on record, the number of diagnoses codes, and length of stay. Females within income quartile of $45,000 or more and the Black racial/ethnicity were all significant predictors of length of stay. Based on the statistical significance I rejected the null hypothesis there was no association between race, primary expected payer, income, number of procedure codes on record, number of diagnoses on record and length of stay among females ages 15-44 in the United States with ectopic pregnancy after controlling for income and education.

Independent samples t-tests were used to assess whether significant differences existed between ectopic pregnancy participants who had one procedure code of record and between ectopic pregnancy participants who had two or more procedure codes of record for age, the number of diagnoses, and length of stay. I found a statistically

significant relationship between age, number of procedures, and length of stay; therefore, I rejected the null hypothesis. In Section 4, I discuss the findings of my research, the potential application to professional practice, and implications for positive social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The purpose of this quantitative cross-sectional study was to examine racial/ethnic disparities among females diagnosed with ectopic pregnancy and determine if race, primary expected payer, number of procedure codes, and number of diagnoses were associated with length of stay in females ages 15-44 diagnosed with ectopic pregnancy. Additionally, I assessed whether significant differences existed between ectopic pregnancy participants who had one procedure code of record and participants who had two or more procedure codes of record for age, number of diagnoses, and length of stay. I used data from the 2014 NIS for the analyses.

Key findings from the study were that income, age, the number of procedures on record, the number of record diagnoses, and racial identity were significant predictors of length of stay. For RQ1, the results indicated that holding all variables in the regression model constant, for every standard deviation unit increase in the number of procedures ($\beta = 0.13$, $p < .001$), the length of stay also increased by 0.13 units. For RQ2, I found that for every standardized deviation unit increase in number of diagnoses ($\beta = 0.37$, $p < .001$) length of stay increased by .37, units and for every standardized deviation unit increase for the Black racial identity ($\beta = 0.05$, $p < .05$), length of stay increased by 0.05 units. Finally, for every standardized increase in income quartile of $45,000 or more ($\beta = .08$, $p < .001$) length of stay decreased by 0.08 units.

Section 4 provides an interpretation of findings with the existing literature and the TFC as the theoretical framework. The section also includes limitations of the study,

recommendations for further research. Lastly, the section also contains implications for professional practice and positive social change.

Interpretation of the Findings

Race/Ethnicity and Length of Stay

For RQ1, I found an association between race, primary expected payer, income, number of procedure codes on record, number of diagnoses on record, and length of stay among females 15-44 in the United States with ectopic pregnancy. In this study, the Black race and ethnicity were associated with a longer duration of hospitalization. Additionally, females with more recorded diagnosis codes and those who required more interventional procedures during the hospitalization had longer lengths of stay. My findings add to the literature documenting racial disparities in terms of maternal morbidity in the United States. While racial and socioeconomic inequalities in terms of maternal outcomes have been reported previously in women enrolled in Medicaid, my study may be one of the first to focus on national ectopic pregnancy outcomes among females across various primary expected payer groups. A higher propensity for racial/ethnic minority groups to experience more complications and longer lengths of stay compared with Whites suggests that factors related to race and ethnicity adversely impact women's reproductive health beyond just lower income.

SES

In this study, I found that higher SES was associated with shorter length of stay. Females within the income quartile of $45,000 or more per year comprised 21% of the study population, and I found a statistically significant relationship between income and

predicted the shorter length of stay within this group. Medicaid recipients comprised 45% of the study population, which I used as a constant for the regression analysis. Hsu et al. (2017) found that socioeconomic and insurance-related disparities were more common in females within lower SES and those with Medicaid. The results indicated that for every standardized increase in income quartile of $45,000 or more ($\beta = .08$, $p < .001$) length of stay decreased by 0.08 units. Rawshwani et al. (2016) found that SES was the strongest predictor of complications resulting in extended hospitalization. My study results in comparison to the existing literature also found a statistically significant association between health outcomes and SES. In this study, females earning higher incomes were less likely to experience complications that required prolonged hospitalizations. The current study may be one of the first that included females with higher SES, whereas prior studies exclusively examined women with lower SES.

Morbidity and Complications

Results for RQ2 indicated that age, number of diagnoses, and length of stay differed between females 15-44 diagnosed with ectopic pregnancy in the United States who have one procedure code versus two or more procedure codes. The severity of the patient's condition (morbidity) may be associated with the number of the diagnosis and procedure codes of record. Results for RQ2 indicate a statistically significant relationship between age, the number of diagnoses, and procedures of record which indicate higher morbidity which predicts a longer length of stay for younger females (mean age = 29), those with two or more diagnoses, and also those with two or more procedures on record. For age, there was a statistically significant difference of .81 with a Cohen's *d* effect size

of .14 with participants having two more procedures having a higher age at admission at 29.77. The number of diagnoses was also statistically significant, with participants having two or more procedures having 4.02 diagnoses compared to 3.01 for those with only one procedure with a Cohen's *d* effect size of .38. Length of stay was also statistically significant, with a mean difference of .34 and a Cohen's *d* effect size of .32 with participants with two more operations staying 1.77 days on average in the hospital.

Although ectopic pregnancies occur in all groups of women, Black, Hispanic, and Asian women are more likely to experience complications resulting in blood transfusions and prolonged hospitalization (Stulberg et al., 2016). Papillon-Smith et al. (2014) observed that the development of hemoperitoneum in 8,706 patients (24.50%) was the most common complication, the Asian race was the sociodemographic variable most predictive of transfusion, and Medicare insurance status for younger women with disabilities was most influential on prolonged hospitalization.

The results of the current study were similar to Papillon-Smith et al. (2014) in that a statistically significant association was found that the Black race was a strong predictor for an extended length of hospitalization. Additionally, the current study findings showed the mean age for females that required more prolonged hospitalizations was 29 years of age. The results from the present study extend the existing knowledge in the literature that maternal age, in addition to lower SES and race (Black, Hispanic, or Asian), may also be a predictor of ectopic pregnancy morbidity.

The TFC

The theoretical framework used to guide this study was TFC. The theory constructs address the persistent association between SES and mortality despite innovations in the management of diseases and other explanatory risk factors (Phelan et al., 2010). Health-promoting resources such as finances, power, knowledge, status, and beneficial social connections influence which people learn about and access innovative medical advances and treatments earlier in the disease process (Link & Phelan, 1995). The connection of higher SES to health is established through disease prevention or improved prognosis after the onset of disease (Link & Phelan, 1995).

The results of the study showed that lower SES was associated with higher complications in women diagnosed with ectopic pregnancy. The demographics of the study population (n = 2,526 94%) indicated that most participants had access to health coverage. Females with a yearly income of $45,000 and higher had shorter hospitalizations. Black race and ethnicity predicted a longer length of hospitalization. Almost one-half of the sample participants participated in Medicaid or Medicare (47%), health coverage in which Black women and those with lower SES and/or disability are disproportionally represented (Stulberg et al., 2016). According to the overall constructs of the TFC, sociodemographic factors inclusive of race, income, and insurance status influence access to health resources and outcomes (Link & Phelan, 1995). Although White females comprised 34% of the sample population which was just slightly more than 30% of Black females in the sample, the Black race was a strong predictor of extended hospitalization and increased morbidity. The TFC was used in this study to

examine the personal characteristics of the study population, including SES, to evaluate at-risk patients for complications and the need for the development of interventions to achieve the best possible outcomes (Qasim, 2016). The benefit of examining ectopic pregnancy disparities as a public health issue and the application of TFC was that the theory highlighted the existence of multifaceted and interrelated factors and relationships which may impact patient outcomes (Link & Phelan, 1995).

Limitations of the Study

The results of the study were obtained from a secondary data analysis of the 2014 NIS with a target population of 15-44-year-old females diagnosed with ectopic pregnancy in the United States. The findings of the study may be generalized to the U.S. population because the sample was drawn from the 2014 NIS which contains data from 44 states and the District of Columbia, representing 96 percent of the U.S. population and includes 94 percent of discharges from U.S. community hospitals (HCUP, 2014). The 2014 NIS is a sample of hospital discharges and is derived from all participating hospitals. Despite being representative of the population, the use of this national database has limitations. The classification of ectopic pregnancy cases and complications were based on ICD-9 discharge diagnosis codes. These discharge diagnosis codes may have been misclassification and are subject to errors in coding (Ling, Lawson, & von Scheven, 2018). A significant limitation of this study was the availability of claims data for inpatient hospital care only. Ectopic pregnancies are currently also treated on an outpatient basis but not accounted for in this analysis. Additionally, the NIS does not include patient identifiers, so the study was specific to each admission and not per

patient. Therefore, the possibility exists that some patients may have been admitted more than once for a single episode of ectopic pregnancy and accounted for in the analysis more than once.

Recommendations

The findings from the current research show that future studies should identify interventions that can continue to improve pregnancy outcomes for all women with a particular focus on identification and interventions targeting the causes of racial and ethnic disparities. Although developments in ectopic pregnancy treatment and diagnosis have resulted in improved health outcomes, not all women have benefited from those advancements. Further studies using a more comprehensive database inclusive of ectopic pregnancy cases across all health care settings are also recommended to provide a more accurate account of ectopic pregnancy morbidity and mortality in the United States. Further studies are also warranted to examine additional factors in females of younger maternal age as a predictor of ectopic pregnancy complications.

Implications for Professional Practice and Social Change

Implications for public health practice include the development of a comprehensive risk assessment of females of child-bearing age during ante-natal care. Practitioners could also use the findings of this research in the development or expansion of age-appropriate and culturally sensitive educational programs and literature to educate females on potential risk factors for complications of ectopic pregnancy. Health care practitioners could also use the results from the study in the development of protocols for tracking patients with ectopic pregnancy across multiple care providers from the initial

presentation of symptoms to definitive diagnosis and treatment. Lastly, an additional implication of this research is to potentially provide knowledge to health care practitioners to better identify characteristics of women at increased risk for adverse outcomes related to ectopic pregnancy during routine health care visits. The implementation of these interventions may potentially contribute to long-term decreases in maternal health complications and further improve ectopic pregnancy morbidity and mortality rates.

In addition to implications for public health practice, this study has implications for social change. The observed disparities confirm the need for additional efforts that seek to improve outcomes among ethnic minority and low-income populations and ultimately reduce the burden of ectopic pregnancy morbidity and mortality in underserved populations This study may provide an evidence-base for public health providers, private, professional, and governmental agencies to enhance the promotion of national guidelines and changes to health care policy to improve ectopic pregnancy outcomes in all women. The study results may also provide answers to questions that could help public health practitioners not only understand why some groups of women experience a higher risk of pregnancy-related complications, but also provide a basis to expand the scope of global concern for the health of women before, during, and after pregnancy.

Conclusion

The current study evaluated the relationship between race, primary expected payer, income, number of procedure codes on record, number of diagnoses on record, and

length of stay among females 15-44 in the United States with ectopic pregnancy. Females within higher income groups were found to have shorter lengths of stay whereas the Black race/ethnicity was a significant predictor of longer length of stay. Additionally, an assessment was made to determine whether significant differences existed between ectopic pregnancy participants who had one procedure code of record and between ectopic pregnancy participants who had two or more procedure codes of record for age, the number of diagnoses, and length of stay.

I found a statistically significant relationship between age, number of procedures, and length of stay in females of younger maternal age and those with more than two or more diagnoses and procedures of record. A longer length of stay was observed in younger females and those with two or more procedures and diagnoses of record. A longer length of stay in racial/ethnic minority groups, compared with whites, suggests that factors associated with race and ethnicity negatively impact women's reproductive health extend beyond an association with lower SES.

The findings from the current research showed that future studies should aim to identify interventions that can continue to improve pregnancy outcomes for all women with a particular emphasis on identifying and addressing the causes of racial and ethnic disparities. The study results could also provide useful knowledge for public health professionals and researchers who are searching for directions to improve health outcomes related to women’s productive health. Positive social change may result in improved outcomes among ethnic minority and low-income populations, which will

ultimately reduce the burden of ectopic pregnancy morbidity and mortality in underserved populations.

References

American College of Obstetricians and Gynecologists. (2018). Tubal ectopic pregnancy. *ACOG Practice Bulletin.* Retrieved July 27, 2018, from https://www.acog.org/Clinical-Guidance-and-Publications/Practice-Bulletins/Committee-on-Practice-Bulletins-Gynecology/Tubal-Ectopic-Pregnancy#47.

American Medical Informatics Association. (n.d.). Population-level studies reveal ways to enhance patient care and improve patient care. Retrieved September 13, 2019, from https://www.amia.org/sites/default/files/files_2/Population-Level-Studies-03-26-09.pdf.

Callaghan, W. M., Creanga, A. A., & Kuklina, E. V. (2012). Severe maternal morbidity among delivery and postpartum hospitalizations in the United States. *Obstetrics & Gynecology*, *120*(5), 1029-1036.

Bhopal, R. (2004). Glossary of terms relating to ethnicity and race: For reflection and debate. *Journal of Epidemiology & Community Health*, *58*(6), 441-445. doi:10.1136/jech.2003.013466

Centers for Disease Control and Prevention. (2013). CDC health disparities and inequalities report — United States, 2013. *Morbidity and Mortality Weekly Report*, *62*(Suppl. 3), 184-186. Retrieved from https://www.cdc.gov/mmwr/pdf/other/su6203.pdf

Centers for Disease Control and Prevention (2015). National hospital discharge survey. Retrieved from https://www.cdc.gov/nchs/nhds/index.htm

Centers for Medicaid and Medicare Services. (2008). Clarification of patient discharge status codes and hospital transfer policies. Retrieved from https://www.cms.gov/medicare/medicare-contracting/contractorlearningresources/downloads/ja0801.pdf

Cohen, A., Almog, B., Satel, A., Lessing, J. B., Tsafrir, Z., & Levin, I. (2013). Laparoscopy versus laparotomy in the management of ectopic pregnancy with massive hemoperitoneum. *International Journal of Gynecology & Obstetrics*, *123*(2), 139-141.

Creanga, A. A., Shapiro-Mendoza, C. K., Bish, C. L., Zane, S., Berg, C. J., & Callaghan, W. M. (2011). Trends in ectopic pregnancy mortality in the United States: 1980–2007. *Obstetrics & Gynecology*, *117*(4), 837-843.

Creanga, A. A., Berg, C. J., Syverson, C., Seed, K., Bruce, F. C., & Callaghan, W. M. (2015). Pregnancy-related mortality in the United States, 2006–2010. *Obstetrics & Gynecology*, *125*(1), 5-12.

Creswell, J.W. & Creswell, D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed). Los Angeles, CA: SAGE Publishing.

Davern, M., Rodin, H., Beebe, T. J., & Call, K. T. (2005). The effect of income question design in health surveys on family income, poverty, and eligibility estimates. *Health Services Research*, *40*(5), 1534-1552. doi:10.1111/j.1475-6773.2005.00416.x

Faul, F., Erdfelder, E., Lang, A.-G. & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*, 175-191.

Finer, L. B., & Zolna, M. R. (2016). Declines in unintended pregnancy in the United States, 2008-2011. *New England Journal of Medicine, 374*(9), 843-852.

Frankfort-Nachmias, C., Nachmias, D., & DeWaard, J. (2014). Research methods in the Social Sciences (8th ed.). New York, NY: Worth Publishers.

Frandsen, B. R., Joynt, K. E., Rebitzer, J. B., & Jha, A. K. (2015). Care fragmentation, quality, and costs among chronically ill patients. *The American Journal of Managed Care*, *21*(5), 355-362.

Galanter, W. L., Applebaum, A., Boddipalli, V., Kho, A., Lin, M., Meltzer, D., ... & Lambert, B. L. (2013). Migration of patients between five urban teaching hospitals in Chicago. *Journal of Medical Systems*, *37*(2), 9930.

Goldner, T. E., Lawson, H. W., Xia, Z., & Atrash, H. K. (1993). Surveillance for ectopic pregnancy—United States, 1970–1989. *Morbidity and Mortality Weekly Report: CDC Surveillance Summaries*, 73-85.

Graboyes, E. M., Kallogjeri, D., Saeed, M. J., Olsen, M. A., & Nussenbaum, B. (2017). Postoperative care fragmentation and thirty-day unplanned readmissions after head and neck cancer surgery. *The Laryngoscope*, *127*(4), 868–874. doi:10.1002/lary.26301

Hatzenbuehler, M. L., Phelan, J. C., & Link, B. G. (2013). Stigma as a fundamental cause of population health inequalities. *American Journal of Public Health, 103*(5), 813–821. doi:10.2105/AJPH.2012.301069

Hayward, M. D., Hummer, R. A., & Sasson, I. (2015). Trends and group differences in the association between educational attainment and US adult mortality: Implications for understanding education's causal influence. *Social Science & Medicine*, 127, 8-18.

Healthcare Cost and Utilization Project. (2016). HCUP NIS Database Documentation Agency for Healthcare Research and Quality, Rockville, MD. Retrieved March 31, 2019, from https://www.hcup-us.ahrq.gov/db/nation/nis/NISIntroduction2014.pdf.

Hsu, J. Y., Chen, L., Gumer, A. R., Tergas, A. I., Hou, J. Y., Burke, W. M., ... & Wright, J. D. (2017). Disparities in the management of ectopic pregnancy. *American Journal of Obstetrics & Gynecology*, 217(1), 49-e1.

Howell, D.C. (2014). *Fundamental statistics for the behavioral sciences (9th ed).* Boston, MA: Cencage Learning.

Jaspan, D., Giraldo-Isaza, M., Dandolu, V., & Cohen, A. W. (2010). Compliance with methotrexate therapy for presumed ectopic pregnancy in an inner-city population. *Fertility and Sterility*, 94 (3), 1122–1124

Kaiser Family Foundation. (2017). Women's health insurance coverage. Retrieved July 31, 2018, from https://www.kff.org/womens-health-policy/fact-sheet/womens-health-insurance-coverage-fact-sheet/.

Klein, E. Y., Levin, S., Toerper, M. F., Makowsky, M. D., Xu, T., Cole, G., & Kelen, G. D. (2017). The effect of Medicaid expansion on utilization in Maryland emergency departments. *Annals of Emergency Medicine*, *70*(5), 607-614.

Kramer, M. S., Seguin, L., Lydon, J., & Goulet, L. (2000). Socio-economic disparities in pregnancy outcome: why do the poor fare so poorly? *Paediatric and Perinatal Epidemiology*, *14*(3), 194-210.

Levant, S., Chari, K., & DeFrances, C. (2016). National Hospital Care Survey Demonstration Projects: Traumatic Brain Injury. *National Health Statistics Reports,* (97), 1-16.

Leyenaar, J. K., Shieh, M. S., Lagu, T., Pekow, P. S., & Lindenauer, P. K. (2014). Variation and outcomes associated with direct hospital admission among children with pneumonia in the United States. *Journal of the American Medical Association Pediatrics*, *168*(9), 829-836.

Ling, N., Lawson, E., & von Scheven, E. (2018). Adverse pregnancy outcomes in adolescents and young women with systemic lupus erythematosus: a national estimate. *Pediatric Rheumatology Online Journal*, *16*(1), 26. doi:10.1186/s12969-018-0242-0Link, B. G., & Phelan, J. (1995). Social conditions as fundamental causes of disease. *Journal of Health and Social Behavior,* 80-94.

Lutfey, K., & Freese, J. (2005). Toward some fundamentals of fundamental causality: Socioeconomic status and health in the routine clinic visit for diabetes. *American Journal of Sociology, 110*(5), 1326-1372. doi:10.1086/428914

Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: theory, evidence, and policy implications. *Journal of Health and Social Behavior*, *51*(1_suppl), S28-S40.

Polonijo, A.N., & Carpiano, R.M. (2013). Social inequalities in adolescent human papillomavirus (HPV) vaccination: a test of fundamental cause theory. *Social Science & Medicine*, *82*, 115-2 .

Lund Jensen, N., Pedersen, H. S., Vestergaard, M., Mercer, S. W., Glümer, C., & Prior, A. (2017). The impact of socioeconomic status and multimorbidity on mortality: a population-based cohort study. *Clinical Epidemiology*, *9*, 279–289. doi:10.2147/CLEP.S129415

Lutfey, K., & Freese, J. (2005). Toward some fundamentals of fundamental causality: Socioeconomic status and health in the routine clinic visit for diabetes. *American Journal of Sociology*, *110*(5), 1326-1372.

MacDorman, M. F., Declercq, E., & Thoma, M. E. (2017). Trends in maternal mortality by sociodemographic characteristics and cause of death in 27 states and the District of Columbia. *Obstetrics & Gynecology*, *129*(5), 811-818.

Mays, J. A., Jackson, K. L., Derby, T. A., Behrens, J. J., Goel, S., Molitch, M. E., ... & Wallia, A. (2016). An evaluation of recurrent diabetic ketoacidosis, fragmentation of care, and mortality across Chicago, Illinois. *Diabetes Care*, *39*(10), 1671-1676.

McAlister, F. A., Youngson, E., Bakal, J. A., Kaul, P., Ezekowitz, J., & van Walraven, C. (2013). Impact of physician continuity on death or urgent readmission after

discharge among patients with heart failure. *Canadian Medical Association Journal, 185*(14), E681-E689.

McHugh, M. L. (2013). The Chi-square test of independence. *Biochemia Medica*, *23*(2), 143–149. http://doi.org/10.11613/BM.2013.018

Mikhail, E., Salemi, J. L., Schickler, R., Salihu, H. M., Plosker, S., & Imudia, A. N. (2018). National rates, trends, and determinants of inpatient surgical management of tubal ectopic pregnancy in the United States, 1998–2011. *Journal of Obstetrics and Gynaecology Research*, *44*(4), 730-738.

National Center for Health Statistics. (2015). National Hospital Care Survey. Retrieved August 7, 2018, from https://www.cdc.gov/nchs/nhcs/index.htm.

National Quality Forum. (2009). National voluntary consensus standards for emergency care: A consensus report. Washington, DC: National Quality Forum.

Panelli, D. M., Phillips, C. H., & Brady, P. C. (2015). Incidence, diagnosis, and management of tubal and nontubal ectopic pregnancies: a review. *Fertility Research and Practice*, *1*(1), 15.

Papillon-Smith, J., Imam, B., Patenaude, V., & Abenhaim, H. A. (2014). Population-based study on the effect of socioeconomic factors and race on management and outcomes of 35,535 inpatient ectopic pregnancies. *Journal of Minimally Invasive Gynecology*, *21*(5), 914-920.

Phelan, J. C., Link, B. G., & Tehranifar, P. (2010). Social conditions as fundamental causes of health inequalities: theory, evidence, and policy implications. *Journal of Health and Social Behavior*, *51*(1_suppl), S28-S40.

Qasim, A. B. D. (2016). Using the theory of fundamental causes to show the potential effects of socioeconomic status on surgical outcomes. *Journal of Health Disparities Research and Practice*, *9*(2), 8.

Ranjit, A., Chaudhary, M. A., Jiang, W., Zhan, T., Schneider, E. B., Cohen, S. L., ... & Witkop, C. T. (2017). Disparities in receipt of a laparoscopic operation for ectopic pregnancy among TRICARE beneficiaries. *Surgery*, *161*(5), 1341-1347.

Rawshani, A., Svensson, A. M., Zethelius, B., Eliasson, B., Rosengren, A., & Gudbjörnsdottir, S. (2016). Association between socioeconomic status and mortality, cardiovascular disease, and cancer in patients with type 2 diabetes. *JAMA Internal Medicine*, *176*(8), 1146-1154.

Santana, D. S., Cecatti, J. G., Costa, M. L., Haddad, S. M., Parpinelli, M. A., Sousa, M. H., ... & Pinto e Silva, J. L. (2014). Awareness about a life-threatening condition: ectopic pregnancy in a network for surveillance of severe maternal morbidity in Brazil. *BioMed Research International*

Salazar, L. F., Crosby, R. A., & DiClemente, R. J. (2015). *Research methods in health promotion*. John Wiley & Sons. Hoboken, NJ.

Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, *61*(3), 261–264. http://doi.org/10.4103/0019-5154.182410

Stulberg, D. B., Zhang, J. X., & Lindau, S. T. (2011). Socioeconomic disparities in ectopic pregnancy: predictors of adverse outcomes from Illinois hospital-based care, 2000–2006. *Maternal and Child Health Journal*, *15*(2), 234-241.

Stulberg, D. B., Cain, L. R., Dahlquist, I., & Lauderdale, D. S. (2013). Ectopic pregnancy rates in the Medicaid population. *American Journal of Obstetrics and Gynecology*, *208*(4), 274-e1.

Stulberg, D. B., Cain, L. R., Dahlquist, I., & Lauderdale, D. S. (2014). Ectopic pregnancy rates and racial disparities in the Medicaid population, 2004–2008. *Fertility and Sterility*, *102*(6), 1671-1676.

Stulberg, D. B., Dahlquist, I., Jarosch, C., & Lindau, S. T. (2016). Fragmentation of care in ectopic pregnancy. *Maternal and Child Health Journal*, *20*(5), 955-961.

Tsai, T. C., Orav, E. J., & Jha, A. K. (2015). Care fragmentation in the post-discharge period: surgical readmissions, distance of travel, and postoperative mortality. *JAMA Surgery*, *150*(1), 59-64

Tunçalp, Ö., Hindin, M. J., Souza, J. P., Chou, D., & Say, L. (2012). The prevalence of maternal near-miss: a systematic review. *BJOG: An International Journal of Obstetrics & Gynaecology*, *119*(6), 653-661.

U. S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion (2018). Maternal, infant, and child health. In Healthy People 2020. Retrieved July 23, 2018, from https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health.

Van den Broeck, J., Cunningham, S. A., Eeckels, R., & Herbst, K. (2005). Data cleaning: detecting, diagnosing, and editing data abnormalities. *PLoS medicine*, *2*(10), e267.

van Mello, N. M., Zietse, C. S., Mol, F., Zwart, J. J., van Roosmalen, J., Bloemenkamp, K. W., ... & Hajenius, P. J. (2012). Severe maternal morbidity in ectopic pregnancy is not associated with maternal factors but may be associated with quality of care. *Fertility and Sterility*, *97*(3), 623-629.

Williams, S., Gousen, S., & DeFrances, C. (2018). National Hospital Care Survey demonstration projects: Pneumonia inpatient hospitalizations and emergency department visits. *National Health Statistics Reports,* (116), 1-11.

World Health Organization, UNICEF, UNFPA, the World Bank, and the United Nations Population Division. (2014). Trends in maternal mortality: 1990 to 2013. Retrieved August 7, 2018, from http://www.who.int/reproductivehealth/publications/monitoring/maternal-mortality-2013/en/.

Zogg, C. K., Zafar, S. N., Shah, A. A., Ottesen, T. D., Wasif, N., & Haider, A. H. (2017). Not all readmissions are equal: Results of care fragmentation on outcomes and payment implications for common medical and surgical conditions. *Journal of the American College of Surgeons*, *225*(4), S123-S124.